

REMARKS

By the present amendment, claims 63, 64 and 67-71 are pending in the application. Claims 63 and 64 are the independent claims.

Claim Amendment

Independent claims 63 and 64 have been amended to specify that --the metal coating is a metal consisting essentially of one or more of nickel, cobolt, chromium, platinum, palladium and tungsten--.

This amendment is supported by prior, now canceled, dependent claim 65 which specified that the metal of the metal coating can be one or more of nickel, cobolt, chromium, platinum, palladium and tungsten.

This amendment has been made in response to the statement at the first two paragraphs of page 5 of the Office Action mailed October 6, 2006 which state:

Applicant alleges, "US '579 does not disclose or suggest a diffusion layer at an interface between the metal coating having a high melting temperature."

This allegation is respectfully deemed unpersuasive because the claims are not so limited, and Eldridge is not necessarily applied to the rejection for this disclosure.

In response to these comments of the Office Action, independent claims 64 and 65 of the present amendment have been amended by the present amendment to limit the metal of the metal coating to a high melting point metal, i.e., one or more of nickel, cobolt, chromium, platinum, palladium and tungsten.

The melting point of these metals is about:

nickel	- 1455°C	platinum	- 1769°C
cobolt	- 1492°C	palladium	- 1552°C
chromium	- 1850°C	tungsten	- 3380°C

§102

Claims 63-65 and 67-71 were rejected under 35 U.S.C. §102(e) as being anticipated by U.S. Patent No. 6,727,579 to Eldridge.

This rejection, as applied to the amended claims, is respectfully traversed.

Patentability

The present invention provides a semiconductor device, using a bonding material for linking a semiconductor terminal to a connecting terminal for an outside circuit by reinforcing the bonding material and/or a joint between the semiconductor terminal and the connecting terminal with a reinforcing material. This reinforcing material is limited to high melting point metals, such as nickel (M.P.: 1455°C), cobolt (M.P.: 1492°C), chromium (M.P.: 1850°C), platinum (M.P.: 1769°C), palladium (M.P.: 1552°C) and tungsten (M.P.: 3380°C).

The technology disclosed in U.S. Patent No. 6,727,579 (the “ ‘579 patent”) relates to an electrical contact structure formed by configuring a flexible wire to have a springable shape and over coating the wire with at least one layer of a resilient conductive material. More specifically, this structure of the ‘579 patent is formed by depositing tin as a first layer on a gold wire stem, with a subsequent reaction of gold and tin at a temperature below the melting temperature of gold-tin eutectic for reinforcing the gold, and then coating nickel or other alloys for precipitation, as mentioned at column 23, lines 37-41.

The present invention is directed to a semiconductor connecting material/diffusion layer/high melting point reinforcing material. On the other hand, the '579 patent is directed to a gold bonding wire/gold-tin eutectic alloy/coating material. Therefore, the present invention is quite different from the technology disclosed or suggested in the '579 patent in the point of the structure and using high melting point metals.

Further, as shown in Table 2, at page 27 of the specification, after resin sealing, the wire deformation is improved more than 10% in case of using a high melting point alloys, such as nickel, cobalt, chromium, platinum, palladium and tungsten, according to the present invention. On the other hand, the wire deformation is only improved about 5% in case of using a low melting point alloy, such as tin, silver and copper, according to the conventional manner.

It is submitted that if the semiconductor connecting material is reinforced by a high melting point metal, such as nickel, cobalt, chromium, platinum, palladium and tungsten, a diffusion layer having a high melting point is formed between the semiconductor connecting material and the reinforcing material. On the other hand, if the semiconductor connecting material is reinforced by a low melting point metals, such as tin, silver and copper, adhesion ability gets worse, especially in case of using tin, a low melting point eutectic alloy having a melting point of less than 300°C. As a result, gold-tin eutectic alloy of the '579 patent is melted in a high temperature environment, such as heat-treatment during the bonding wire production process, or connection of bonding wire after resin sealing. In the worst case, the bonding wire breaks down. In the present invention, a high melting point metal must be used for avoiding above mentioned defect.

The '579 patent does not disclose or suggest the characteristic feature of the present invention. Therefore, the present invention is quite different from the technology disclosed in the '579 patent.


It is therefore submitted that amended independent claims 63 and 64, and all claims dependent thereon, are patentable over U.S. Patent No. 6,727,579 to Eldridge.

CONCLUSION

It is submitted that in view of the present amendment and foregoing remarks, the application is now in condition for allowance. It is therefore respectfully requested that the application, as amended, be allowed and passed for issue.

Respectfully submitted,

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